STAKEHOLDER WORKSHOP #1

SUSTAIN

System for Urban Stormwater Treatment and Analysis INtegration

King County

EPA

Applying SUSTAIN:

Objectives

What questions need to be answered?

What are numeric control targets for these objectives?

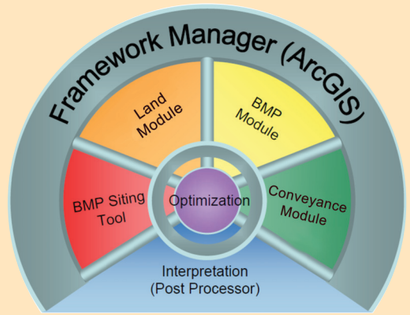
Data Collection & Analysis
- Study area review
- GIS data: land use, stream, DEM, BMP sites, etc.
- Watershed and BMP information/data
- Compile monitoring data (calibration/validation)

Project Setup
- BMP representation: placement, configuration, and cost
- LAND/WATERSHED Representation
- Routing network
- Assessment point(s)
- Test system application (externally calibrated model)
- Calibrate/validate model (internal model)

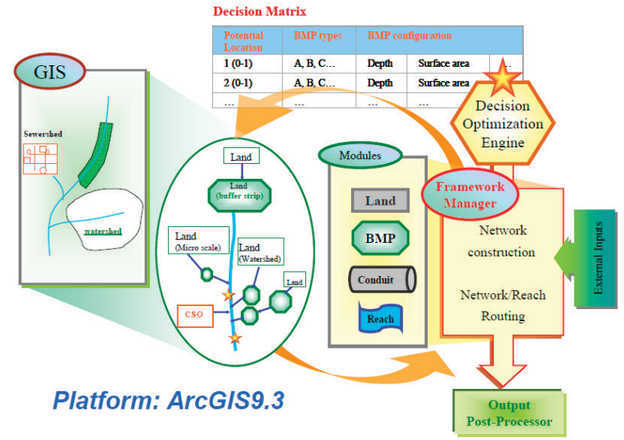
Put Optimization Processor to Work!
- Select decision variables (BMP dimensions)
- Select assessment points (BMP/Outlet locations)
- Select evaluation factors, control targets (end points)

Results Analysis and Representation (Post-Processor)
- Optimum BMP dimensions
- Alternate solutions

SUSTAIN is a decision support system to facilitate selection and placement of Best Management Practices (BMPs) and Low Impact Development (LID) techniques at strategic locations in urban watersheds. SUSTAIN integrates 7 modules under an ArcGIS platform.



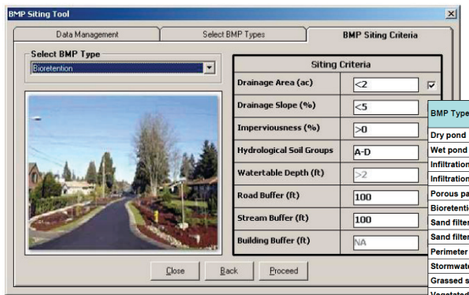
SUSTAIN MODEL STRUCTURE



Platform: ArcGIS9.3

SUSTAIN Flow Chart:

Overview of SUSTAIN component set up and interaction. The Framework Manager facilitates component interaction to route water through the system. SUSTAIN repeats the interaction to evaluate numerous BMP scenarios until the user-defined criteria are met.

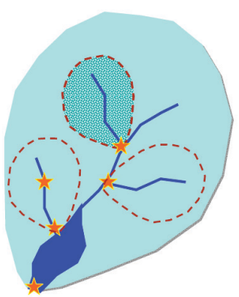


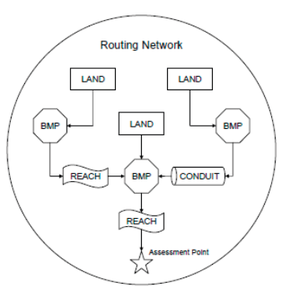
BMP Type	Data Requirement					EPA/600/R-04/184						EPA/600/R-04/121			
	EL	SL	UL	WT	RD	DA	DS	LS	HG	WT	RD	DA	DS	HG	WT
Dry pond	X	X	X	X		>10	<15	flat	A-D	>2			flat	A-D	>4
Wet pond	X	X	X	X		>20	<15	flat	A-D	>2		>25	flat	A-D	>4
Infiltration trench	X	X	X	X		<5	<15	flat	A-B	>2		<5	<15	>.5	>4
Infiltration basin	X	X	X	X								<10	<15	>.5	>4
Porous pavement	X	X	X	X		<1/3	<1	0	A-B	>2					
Bioretention	X	X	X	X	X	<5	<5	<5	A-D	>2	30	<2	flat	A-D	>2
Sand filter (surface)	X	X	X	X		<10	<10	0	A-D	>2		<10	flat	A-D	>2
Sand filter (non-surface)	X	X	X	X		<2	<10	0	A-D	>2		<2	flat	A-D	>2
Perimeter filter	X	X	X	X								<2	flat	A-D	>2
Stormwater wetland	X	X	X	X		>20	<15	flat	A-D	>2		>25	flat	A-D	>4
Grassed swales	X	X		X	X	<5	<6	1-6	A-C	>2	30	<5	<4	A-D	>2
Vegetated filterstrip	X	X		X	X		<10	2-10	A-C	>2	30	N/A	<10	A-D	>2
Rain barrel			X			30 ft buffer around house/building									
Cistern			X			30 ft buffer around house/building									
Green roof			X			house/building									

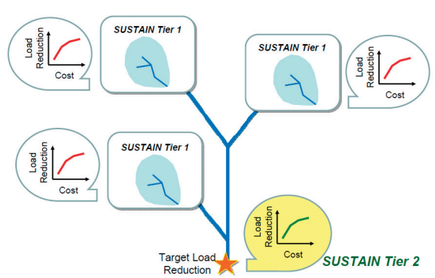
EL: elevation WT: watertable depth (ft) DS: drainage slope (%)
SL: soil RD: road buffer (ft) LS: local slope (%)
UL: urban landuse DA: drainage area (ac) HG: hydro group

BMP Siting Tool:

Identifies suitable areas for BMP placement based on design criteria.

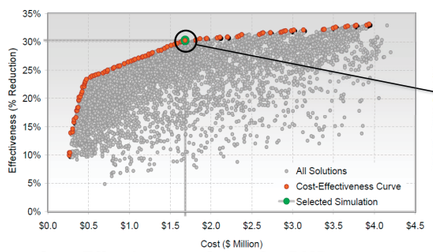




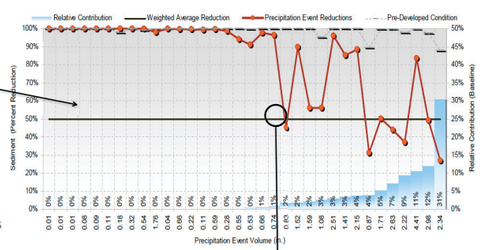


Assessment Points and Optimization Goals:

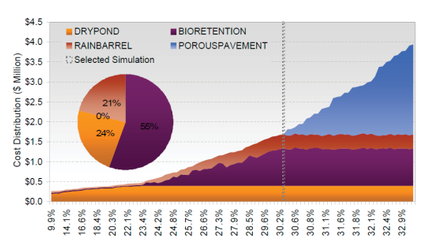
Users manually select assessment points for defined water quality and flow reduction goals. Upstream of each assessment point, SUSTAIN connects the simulation components through a routing network. A Tier 2 approach creates cost-effectiveness curves for the simulated subwatersheds to develop a combined cost-effectiveness curve for the larger watershed.



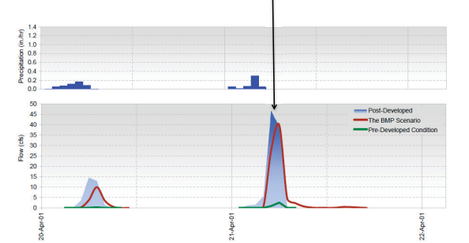
Cost Effectiveness Curve for BMP scenarios



Storm Performance Summary: Sediment Removal



Cost Distribution for Cost Effectiveness Curve



Storm Event Viewer

Post Processing and Results Analysis:

The post processor allows the user to simultaneously view the cost-effectiveness curve and cost distribution for various BMP scenarios. The storm event and performance viewers summarize the performance of BMPs for specified storm events.